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A NEW OYSTER FROM THE CRETACEOUS OF CUBA

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AN oyster, found during the excavation for a well near the Biological Station and Botanical Gardens of Harvard University (Atkins Foundation) at Soledad, near Cienfuegos, Cuba, proves to belong to a previously unknown species.

Family OSTREIDAE Lamarek.

Genus ARCTOSTREA Pervinquière.

Arctostrea atkinsi, sp. nov.

Plate 7, fig. 1, 2.

Holotype.—No. 15000, Museum of Comparative Zoölogy. *Paratypes*, Nos. 15001 a, b.

Description.—Shell large for the genus, extraordinarily thick and massive. No complete valve is known, but large fragments lacking the hinge are lunate, narrow, and taper very gradually to a blunt distal end. The shell is of remarkable thickness, a characteristic apparently attained after almost full length was reached, by the additions of successive lamellae from hinge to tip. Each lamella was of approximately the same length and width as its predecessor, so that the shell remains flat-sided, in spite of the excessive precipitation of calcium carbonate. The outer surface is not preserved, but lamellae which must have been close to the exterior are smooth, and the shell may have been only marginally ribbed. Indications of ribs are seen in the relatively small, toothlike projections along the lateral and terminal margins. The surface may have been similar to that of *Arctostrea semiplana* (Sowerby) (see Woods, 1913, pl. 57, fig. 12a, 13; pl. 58, fig. 1-5) or *A. pristiphora* (Coquand, 1869, p. 51, pl. 17, fig. 17, 18), in which the greater part of the valve is smooth, but there are short marginal ribs which produce interlocking denticules.

Only a part of the muscle scar is shown by any specimen. It is small, far back, apparently almost marginal, and not far from the hinge.

Measurements.—In the absence of any specimen showing the hinge it is not possible to give the true length and height. These measurements are not, however, very important in such irregular shells as oysters. The fragment of a right valve used as the holotype has a length of 240 mm. as measured along the curvature of the anterior side, and is 53 mm. in greatest width. The anterior margin makes about half of a circle with a radius of about 90 mm. The crests of the marginal denticulations are about 10 mm. apart, and each is about 5 mm. high. The shell is more than 55 mm. thick near the distal end, and a transverse fracture at the proximal end shows 12 lamellae in a thickness of 10 mm.

Comparison with other species.—Very diverse opinions exist as to what constitutes a genus or species among the oysters. There seem to be valid reasons, however, for recognizing Pervinquière's (1911, p. 646) subgenus *Arctostrea*, and Douvillé (1911, p. 637-638) has shown that although there are three species of this genus in the Jurassic, it reaches its chief development in the Cretaceous. The best known is *Arctostrea carinata* (Lamarek), the type of the genus. This species has a wide distribution in Europe and

America, and is more or less variable in its characteristics, but apparently never produces shells so large, thick, or flat-sided as those from Cuba. In fact, these features serve to differentiate *Arctostrea atkinsi* from nearly all allied forms. Woods (1913, p. 342-355) has illustrated, under the name *Ostrea diluviana*, several shells belonging to *Arctostrea*. Among them are some old individuals showing considerable thickening of the valves, as in his fig. 127, p. 353, fig. 99, p. 348, or fig. 138, p. 354. None of these, however, shows the great size or flat sides of *A. atkinsi*. Coquand (1869, p. 76, pl. 29, fig. 1, 2, labelled *Ostrea colubrina*) figured as an example of *Arctostrea pectinata* (Lamarck) a very large oyster which measures 275 mm. along the curvature of the anterior margin. This specimen is of about the same size as the one from Soledad, and agrees further in having the muscle scar almost marginal. *A. pectinata* has, however, coarser ribs than *A. atkinsi*, and the sides are not flattened. The only species which I have been able to find which shows this latter characteristic is *Arctostrea rectangularis* (Roemer), as figured by Coquand (1869, p. 187, pl. 72, fig. 5-11). Roemer's (1839, pl. 18, fig. 15) original figure merely suggests a lateral flattening, but that presented by Coquand shows a shell in many respects like *A. atkinsi*. The distal portion of the right valve is flattened and nearly smooth along the middle, and the interlocking projections along the margins of the valve are of about the same size as in the shell from Cuba. *A. rectangularis* is, however, a smaller shell, and becomes much narrower distally.

Horizon and locality.—Fragments of three right valves of this species were obtained about 8 feet below the surface, during the digging of a well on the Santa Rosalia property near the Harvard Botanical Gardens on the estate of Mr. Edwin F. Atkins, south-east of Cienfuegos, Cuba. The exact horizon remains unknown, but is doubtless within some subdivision of the Cretaceous. The nearest ally, *Arctostrea rectangularis*, is found in the Neocomian, and *A. carinata* is characteristic of the Cenomanian, so that the upper part of the Lower, or the base of the Middle Cretaceous, is suggested. Similar oysters, such as *A. pristiphora* (Coquand) and *A. pectinata* (Lamarck) are, however, found in the Campanian and Santonian, so that it is not impossible that our species is really from the Upper Cretaceous. The few fossils found with the oysters have been examined by Dr. T. W. Stanton, who reports the presence of a very oblique and somewhat peculiar type of *Cucullaea*, and an Echinoid which appears to be a *Holactypus*, a genus which, according to Doctor Stanton, ranges from the Jurassic through the Comanchean. Unfortunately these two undescribed species have no great stratigraphic significance.

G. F. Matthew (1875, p. 29-30) long ago announced the presence of Cretaceous strata along the Damují, a small river entering the western end of Xagua Bay. He stated that the limestone at Constancia Landing and on the Concepcion estate, about 10 miles northwest of Cienfuegos, contains several species of *Hippurites*, *Caprinella*, and *Caprotina*, also corals, *Oliva*, *Conus*, an

oyster of the type of *O. cristata*, Echini, and sponges. Cotteau (1882 and 1897) has described six species of Cretaceous Echini from Cuba, four of which were found in the vicinity of Cienfuegos, one of them at Concepcion de Montalvo. Other writers have referred to the presence of Cretaceous rocks in the vicinity of Cienfuegos, but so far as I can learn, no detailed report on the geology or list of the fossils from the region exists.

The present locality is about 18 miles southeast of that described by Doctor Matthew.

The specimens of *Arctostrea atkinsi* were presented to the Museum of Comparative Zoölogy by Mr. Edwin F. Atkins, founder of the Harvard Biological Station and Botanical Gardens at Soledad, through Dr. Thomas Barbour. We are indebted to him for them, and to Dr. T. W. Stanton and Dr. L. W. Stephenson, who have examined the specimens and furnished references to recent papers on the Ostreidae.

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